REMARKS

Claims 1-20 are pending in the patent application.

The Drawing

Replacement drawings are enclosed, which address all of the issues raised on page 2 of the Office Action.

The Obviousness Rejection

Claims 1-4 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (United States Patent No. 6,403,949) in view of Othonos ("Fiber Bragg Grating"). It is respectfully submitted that the proposed combination of Davis et al. in view of Othonos does not teach or suggest an optical system featuring a chirped Bragg grating etalon that responds to a broadband optical signal, for providing a chirped Bragg grating etalon optical signal having a precise set of optical reference signals, as recited in claim 1. In effect, it is respectfully submitted that there is no teaching in the cited prior art on the record to form an etalon from two chirped gratings and use the chirped Bragg grating etalon formation to provide multiple reference signals in response to such a broadband optical signal.

The Problem in the Art and the Claimed Solution

Pages 1-2 of the patent application set forth the problem in the art being addressed by the claimed invention. In summary, the use of an etalon formed by broadband fiber Bragg grating pairs as shown in Figure 1 of the patent application results in a very limited set of resonant frequencies, as described in the patent application on page 2, line 20, through page 3, line 3. For example, if a resonant optical frequency is outside a very limited region, the light will pass through the fiber Bragg grating etalon cavity unaffected. For a set of reference optical frequencies, the unaffected light is most undesirable and would merely result in the provision of a very limited spectrum of optical reference signals. The use of a multiplicity of etalons formed from a series of broadband fiber Bragg grating pairs in order to overcome this problem raises a whole different set of problems, including issues related to the differing temperature sensitivities of the multiplicity of etalons formed from the broadband fiber Bragg grating pairs.

The inventors recognized the aforementioned problem in the art and provided a solution to the same. To solve this problem, the inventors designed an optical system featuring a chirped Bragg grating etalon that responds to the broadband optical signal, for providing a chirped Bragg grating etalon optical signal having a precise set of optical reference signals, as

recited in claim 1. The precise set of the optical reference signals includes a series of peaks covering most of a source spectral width of the broadband source with the power at the beginning and end of the spectrum of the broadband source passed substantially unaffected by the chirped Bragg grating etalon, as recited in dependent claim 20 (See also dependent claim 4).

In effect, the whole thrust of the claimed invention is to use a broadband source in combination with a chirped Bragg grating etalon in order to provide a precise set of optical reference signals having a broad spectrum of frequencies of interest. As a person skilled in the art would appreciate, the use of the chirped Bragg grating etalon to provide the desired series of peaks covering most of the source spectral width of the broadband source substantially eliminates the differing temperature sensitivities problem that might otherwise occur with the use of the multiplicity of etalons formed from the broadband fiber Bragg grating pairs like that of the prior art shown in Figure 1 of the patent application.

The Proposed Combination

It is respectfully submitted that the cited prior art does not teach or suggest the claimed invention, does not recognize the problem being addressed by the claimed invention, and does not even remotely suggest a solution to the problem.

For example, Davis et al. discloses a method and apparatus for correcting and compensating for systematic error in a wavelength measuring device that includes an instrument box 101 having an optical subsystem 200 and electrical subsystem 202, as best shown in Figure 6. The optical subsystem 200 includes a broadband optical source 204a and pressure and temperature Fiber Bragg Sensors 108, 110, 112, which are compensated for temperature. It is respectfully submitted that Davis et al. does not teach or suggest that the pressure and temperature Fiber Bragg Sensors 108, 110, 112 form a chirped Bragg grating etalon, as recited in claim 1. The reasoning on page 4, second full paragraph, recognizes this point. Because of this, Davis et al.' pressure and temperature Fiber Bragg Sensors 108, 110, 112 clearly do not respond to a broadband optical signal, for providing a chirped Bragg grating etalon optical signal having a precise set of optical reference signals, as also recited in claim 1. Clearly, Davis et al. does not teach or suggest to form an etalon from two chirped gratings and use the chirped Bragg grating etalon formation to provide multiple reference signals in

response to such a broadband optical signal.

Further, it is respectfully submitted that Davis et al. does not recognize the first problem discussed above related to the use of an etalon formed by broadband fiber Bragg grating pairs which results in a very limited set of resonant frequencies, for all the reasons described above. Furthermore, in view of this it is respectfully submitted that Davis et al. also does not recognize the second problem discussed above related to the use of a multiplicity of etalons formed from a series of broadband fiber Bragg grating pairs in order to overcome this problem discussed above, which raises a whole different set of other problems, including issues related to the differing temperature sensitivities of the multiplicity of etalons formed from the broadband fiber Bragg grating pairs, as also discussed above.

In spite of all this, the reasoning on pages 4-5 of the Office Action looks to Othonos to make up for the deficiency in teach of Davis et al and somehow end up with the claimed invention. However, Othonos merely discloses "the chirping of Bragg gratings," as stated on page 4 of the Office Action, third full paragraph. But, similar to Davis et al., Othonos clearly does not teach or suggest to form an etalon from two such chirped gratings and use the chirped Bragg grating etalon formation to provide multiple reference signals in response to such a broadband optical signal, as claimed herein.

In addition, it is respectfully submitted that, similar to Davis et al., Othonos also does not recognize the first problem discuss above related to the use of an etalon formed by broadband fiber Bragg grating pairs which results in a very limited set of resonant frequencies, as described above. Furthermore, in view of this it is also respectfully submitted that Othonos also does not recognize the second problem discussed above related to the use of a multiplicity of etalons formed from a series of broadband fiber Bragg grating pairs in order to overcome this problem discussed above, which raises a whole different set of problems, including issues related to the differing temperature sensitivities of the multiplicity of etalons formed from the broadband fiber Bragg grating pairs, as also discussed above. Based of this deficiency, it is respectfully submitted that there is no motivation to combine the cited prior art in the manner proposed.

Further still, it is respectfully submitted that there is no suggestion to combine Davis et al. in view of Othonos in the manner proposed because Davis et al. merely describes to use a single grating for a single measured reference signal, not multiple gratings that form an etalon for such a single measured reference signal. In effect, the cited prior art teaches away from using multiple gratings or a resonant cavity for such a single measured reference signal.

For all these reasons, it is respectfully submitted that the proposed combination does not teach or suggest the subject matter of the claimed invention.

Dependent Claims 2-4 and 20

Claims 2-4 and 20 depend from claim 1, contain all the limitations therein, and are deemed patentable over the cited prior art for the reasons set forth above.

Claims 16-19

For substantially similar reasons, claims 16-19 are deemed patentable over the proposed combination.

Claims

Claims 5-15 are rejected based on the proposed combination and further in view of Duck et al. (United States Patent No. 5,615,289).

These claims depend directly or indirectly from the main independent claims, contain all the limitations thereof, and are deemed patentable over the proposed combination for all the reasons set forth above. Moreover, it is respectfully submitted that Duck et al. does not make up for the deficiency in teaching of the proposed combination in relation to the aforementioned discussion.

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Conclusion

In view of this, it is respectfully submitted that the reasoning in the rejection of these claims is in error, and should be reversed.

Respectfully submitted,

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WJB/dap
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